

75 BACs signature

Clone name	Mb Start	Mb End	CytoBand
RP11-86K19	65395414	65593152	1p31.3
RP11-219P13	202428509	202603375	1q32.1
RP11-123O6	207724559	207869795	1q32.2
FE0DBACA14ZD04	222362042	222512173	1q42.12
RP11-79O22	223414280	223593296	1q42.13
FE0DBACA14ZG05	230927556	231077745	1q42.2
CTB-17M17	232188241	232278477	1q42.3
FE0DBACA27ZF07	158292971	158432169	2q24.1
RP11-343J7	159682531	159882013	2q24.1
CTA-388C7	206443322	206542163	2q33.3
RP11-90L9	228401139	228557350	2q36.3
FE0DBACA17ZF06	29867284	30018475	3p24.1
CTD-2175D15	59665820	59809076	3p14.2
RP11-25L9	125400950	125564390	3q21.2
CTB-21J19	154805202	154966122	4q31.3
RP11-1103G8	123652516	123817681	5q23.2
RP11-4E3	133085322	133272664	5q31.1
RP11-140I14	134546628	134697478	7q33
RP11-45C4	149169318	149330056	7q36.1
RP11-80J22	154063058	154225480	7q36.2
FE0DBACA12ZH10	91923250	92073564	8q21.3
FE0BPADA8ZF10	98705816	98887966	8q22.1
RP11-237F24	128727360	128877662	8q24.21
RP11-469G7	79296990	79458206	10q22.3
CTD-2022D20	100114750	100279334	10q24.2
CTD-2062E5	103469420	103604807	10q24.32
CTA-224D5	104578855	104583204	10q24.32
RP11-82L24	11604195	11758360	11p15.3
CTB-18O12	53236063	53367863	12q13.2
FE0DBACA8ZD01	21438846	21638239	15q11.2
RP11-49K3	48158395	48330577	15q21.2
RP11-527E24	53328763	53478859	15q21.3
CTB-4N21	56208890	56341570	15q21.3
FE0DBACA3ZH04	57586567	57757359	15q22.2
FE0DBACA8ZE02	58718485	58903081	15q22.2
FE0DBACA28ZE01	2410618	2614456	16p13.3
RP11-499F21	3593657	3759566	16p13.3
RP11-394B14	11741218	11933423	16p13.13
RP11-428C9	47009481	47172659	16q12.1
FE0DBACA22ZF01	57483204	57483382	16q21
RP11-535J5	57299534	57496091	17q23.2
RP11-300L16	58747023	58922997	17q23.3
RP11-81D7	60048296	60066600	17q24.1
FE0DBACA16ZC02	63118104	63295003	17q24.2
RP11-293K20	64588085	64772817	17q24.2
RP11-300G13	65539356	65725424	17q24.3
RP11-108I3	66898641	67067383	17q24.3
FE0DBACA23ZE11	19319405	19415886	18q11.2
RP11-566G8	22578030	22779817	20p11.21
FE0DBACA26ZA01	30051296	30201447	20q11.21
FE0DBACA25ZB10	31614203	31771032	20q11.22
CTD-2061E8	31637589	31771792	20q11.22
FE0DBACA27ZG02	40056244	40190025	20q12
FE0DBACA23ZA08	41619718	41780058	20q13.12
CTD-2200K24	42885215	42976796	20q13.12
FE0DBACA25ZH08	43015778	43166028	20q13.12
FE0DBACA4ZC12	44493014	44673426	20q13.12
FE0DBACA25ZA08	45130950	45339408	20q13.12
FE0DBACA24ZC11	45619161	45769373	20q13.12
RP11-523P17	46899052	47096954	20q13.13
CTD-2112O20	48204012	48335040	20q13.13
RP11-55E1	51802114	51966525	20q13.2
FE0DBACA25ZC11	55104679	55224851	20q13.31
CTD-2045C24	55139993	55256243	20q13.31
FE0DBACA25ZE11	55149709	55241492	20q13.31
RP11-402F1	55772261	55922598	20q13.32
RP11-335C6	57746350	57934405	20q13.33
RP11-460D14	59995746	60208710	20q13.33
FE0DBACA5ZH02	62003365	62160261	20q13.33
RP11-482C1	18984784	19152238	Xp22.13
FE0DBACA1ZH07	38845962	39018790	Xp11.4
RP11-258C19	53025688	53204103	Xp11.22
RP11-126A13	55300128	55467787	Xp11.21
RP11-508G21	99606775	99832145	Xq22.1
RP11-665G20	131583084	131750233	Xq26.2

Table 2

SVM classification of an external set of 23 breast carcinomas

SVM classification				
Histological typing	N	IDC	ILC	Accuracy (%)
IDC	16	12	4	75.0
ILC	7	1	6	85.7
Total	23	13	10	

Table 3

75 ESTs/genes signature

HUGO Gene symbol	Gene Definition	Clone image	Accession number	Unigene	RefSeq	Start	End	CytoBand	Status
JAK2	Janus kinase 2 (a protein tyrosine kinase)	image:789379	BX106933	Hs.591081	NM_004972.2	4975245	5117994	9p24.1	UP DUC
ANKRD32	Ankyrin repeat domain 32	image:182580	H42196	Hs.556673	NM_032290.2	94040330	94057327	5q15	UP DUC
C17orf37	Chromosome 17 open reading frame 37	image:4283597	BC006006	Hs.333526	NM_032339.3	35138937	35140314	17q12	UP DUC
C1orf86	Chromosome 1 open reading frame 86	image:150515	H01457	Hs.107101	NM_182533.1	2110848	2116074	1p36.33	UP DUC
CDH1	Cadherin 1, type 1, E-cadherin (epithelial)	image:214008	H72404	Hs.461086	NM_004360.2	67328696	67426945	16q22.1	UP DUC
DHCR7	7-dehydrocholesterol reductase	image:153009	R50345	Hs.503134	NM_001360.2	70823105	70837125	11q13.4	UP DUC
DOCK3	Dedicator of cytokinesis 3	image:33799	R44552	Hs.476284	NM_004947.3	50687676	51396668	3p21.31	UP DUC
ERBB2	v-erb-b2 erythroblastic leukemia viral oncogene homolog 2, neuro	image:756253	AA480116	Hs.446352	NM_001005862	35097919	35138440	17q12	UP DUC
FKBP4	FK506 binding protein 4, 59kDa	image:341237	W58661	Hs.524183	NM_002014.2	2774414	2783383	12p13.33	UP DUC
FLJ12986	Hypothetical protein FLJ12986	image:306077	N91481	Hs.54713	AK023048.1	87827474	87829903	16q24.3	UP DUC
GRB7	Growth factor receptor-bound protein 7	ipso:0000177	BE246692	Hs.86859	NM_005310.2	35147713	35157063	17q12	UP DUC
HSPA8	Heat shock 70kDa protein 8	image:884719	AA629567	Hs.180414	NM_006597.3	122433411	122438054	11q24.2	UP DUC
LOC284019	Hypothetical protein LOC284019	image:250619	H90075	Hs.370140	AL832149.1	62497017	62503952	17q24.2	UP DUC
MMP24	Matrix metalloproteinase 24 (membrane-inserted)	image:325088	W46985	Hs.567417	NM_006690.3	33278117	33328218	20q11.22	UP DUC
MYBP2C	Myosin binding protein C, fast type	image:306239	N78998	Hs.85937	NM_004533.2	55628004	55661389	19q13.33	UP DUC
N_A	Full length insert cDNA YH97B03	image:30336399	CB990791	Hs.496139		175181399	175181998	1q25.2	UP DUC
N_A		image:291523	N67792			194902888	194903369	3q29	UP DUC
NRGN	Neurogranin (protein kinase C substrate, RC3)	image:177718	H46419	Hs.524116	NM_006176.1	124114952	124122307	11q24.2	UP DUC
RP1A	Ribose 5-phosphate isomerase A (ribose 5-phosphate epimerase)	image:263097	N20072	Hs.469264	NM_144563.2	88772291	88831566	2p11.2	UP DUC
SCARB1	Scavenger receptor class B, member 1	image:51976	H23199	Hs.298813	NM_005505.3	123828129	123914287	12q24.31	UP DUC
STUB1	STIP1 homology and U-box containing protein 1	image:154442	R54831	Hs.592081	NM_005861.2	670116	672768	16p13.3	UP DUC
TFAP2A	Transcription factor AP-2 alpha (activating enhancer binding protein 2 alpha)	image:149884	H00651	Hs.519880	NM_001042425	10504903	10527783	6p24.3	UP DUC
TMEM136	Transmembrane protein 136	image:298746	N74690	Hs.643516	NM_174926.1	119701226	119706556	11q23.3	UP DUC
UBE2L3	Ubiquitin-conjugating enzyme E2L 3	image:327216	W02771	Hs.108104	NM_003347.2	20251957	20308323	22q11.21	UP DUC
UST	Uronyl-2-sulfotransferase	image:220199	H82656	Hs.557541	NM_005715.1	149110157	149439818	6q25.1	UP DUC
VPS37C	Vacuolar protein sorting 37 homolog C (S. cerevisiae)	image:50238	H16997	Hs.523715	NM_017966.4	60654304	60685492	11q12.2	UP DUC
YWHA8	Tyrosine 3-monooxygenase/tryptophan 5-monooxygenase activation protein, beta polypeptide	image:262546	H93919	Hs.651212	NM_003404.3	42947758	42970574	20q13.12	UP DUC
ABCA6	ATP-binding cassette, sub-family A (ABC1), member 6	image:112127	T84930	Hs.647403	NM_080284.2	64586442	64649610	17q24.2-q24.3	UP LOB
ADAM11	ADAM metalloproteinase domain 11	image:184240	H43855	Hs.6088	NM_002390.4	40192094	40214738	7q21.31	UP LOB
ADCY2	Adenylate cyclase 2 (brain)	image:282977	N45141	Hs.481545	NM_020546.2	7449343	7883194	5p15.31	UP LOB
ADIPOQ	Adiponectin, C1Q and collagen domain containing	image:183476	H45617	Hs.80485	NM_004797.2	188043157	188058944	3q27.3	UP LOB
ALDH1A1	Aldehyde dehydrogenase 1 family, member A1	image:309697	N94546	Hs.76392	NM_000689.3	74705408	74757789	9p21.13	UP LOB
ALDH1L1	Aldehyde dehydrogenase 1 family, member L1	image:153982	R67615	Hs.434435	NM_012190.2	127305098	127382175	3q21.2	UP LOB
C14orf139	Chromosome 14 open reading frame 139	image:265829	N20974	Hs.41502	CR457337	94945159	94945729	14q32.13	UP LOB
CAV1	Caveolin 1, caveolae protein, 22kDa	image:377461	AA055368	Hs.74034	NM_001753	115952075	115988466	7q31.2	UP LOB
CCDC82	Coiled-coil domain containing 82	image:277621	N49389	Hs.525088	NM_024725.2	95725589	95762710	11q21	UP LOB
CD34	CD34 molecule	image:770858	AA434387	Hs.374990	NM_001773.2	206126507	206151306	1q32.2	UP LOB
CHES1	Checkpoint suppressor 1	image:221846	H84982	Hs.434286	NM_005197.2	88692278	88953127	14q31.3-q32.1	UP LOB
CIDEA	Cell death-inducing DFFA-like effector c	image:155655	R71842	Hs.567562	NM_022094.2	9883399	9895740	3p25.3	UP LOB
DPT	Dermatopontin	image:153505	R48303	Hs.80552	NM_001937.3	166931331	166960502	1q24.2	UP LOB
EFEB3P1	EF-hand calcium binding protein 1	image:282100	N51496	Hs.560892	NM_022351.2	91872954	92048085	8q21.3	UP LOB
ELN	Elastin (supraaortic aortic stenosis, Williams-Beuren syndrome)	image:810934	AA459308	Hs.647061	NM_000501.1	73080454	73120965	7q11.23	UP LOB
EMCN	Endomucin	image:272630	N36136	Hs.152913	NM_016242.2	101538009	101658202	4q23	UP LOB
ERG	V-ets erythroblastosis virus E26 oncogene homolog (avian)	image:302929	N90107	Hs.473819	NM_182918.2	38675671	38792267	21q22.2	UP LOB
F2R	Coagulation factor II (thrombin) receptor	image:813254	AA455910	Hs.482562	NM_001992.2	76047547	76067054	5q13.3	UP LOB
FABP4	Fatty acid binding protein 4, adipocyte	image:162654	CR744520	Hs.391561	NM_001442.1	8253490	82558004	8q21.13	UP LOB
GDPD2	Glycerophosphodiester phosphodiesterase domain containing 2	image:192521	H41285	Hs.438712	NM_017711.2	69559716	69569965	Xq13.1	UP LOB
IGF1	Insulin-like growth factor 1 (somatomedin C)	image:813179	AA456321	Hs.160562	NM_000618.2	101313807	101398454	12q23.2	UP LOB
MARCH7	Membrane-associated ring finger (C3HC4) 7	image:327461	W20438	Hs.529272	NM_022826.2	160277256	160333329	2q24.2	UP LOB
MFAP4	Microfibrillar-associated protein 4	image:759163	AA496022	Hs.296049	NM_002404.1	19227350	19231086	17p11.2	UP LOB
MMP3	Matrix metalloproteinase 3 (stromelysin 1, progelatinase)	image:324700	BX117609	Hs.375129	NM_002422.3	102211738	102219552	11q22.2	UP LOB
MRGPRF	MAS-related GPR, member F	image:324543	W52061	Hs.118513	NM_145015.2	68528443	68537311	11q13.2	UP LOB
N_A	Transcribed locus, weakly similar to XP_848633.1 similar to LINE-1 reverse transcriptase homolog	image:301068	W07853	Hs.433075		151073054	151383976	Xq28	UP LOB
N_A		image:297752	N69915						UP LOB
NGFR	Nerve growth factor receptor (TNFR superfamily, member 16)	image:154790	R55303	Hs.415768	NM_002507.1	44927666	44947360	17q21.33	UP LOB
OMD	Osteomodulin	image:258606	N32201	Hs.94070	NM_005014.1	94216359	94226381	9q22.31	UP LOB
PK4	Pyruvate dehydrogenase kinase, isozyme 4	image:594120	AA169469	Hs.8364	NM_002612.3	95050749	95063861	7q21.3	UP LOB
PECAM1	Platelet/endothelial cell adhesion molecule (CD31 antigen)	image:127201	R08228	Hs.652132	NM_000442.3	59753596	59817743	17q23.3	UP LOB
PIK3CD	Phosphoinositide-3-kinase, catalytic, delta polypeptide	image:712401	AA281784	Hs.518451	NM_005026.2	9634390	9711556	1p36.22	UP LOB
POU2F2	POU domain, class 2, transcription factor 2	image:186924	H43361	Hs.646363	NM_002698.2	47284513	47328470	19q13.2	UP LOB
RBPA	Retinol binding protein 4, plasma	image:78644	T61830	Hs.50223	NM_006744.3	95341584	95350983	10q23.33	UP LOB
RCSA	RCSA domain containing 1	image:309244	N93864	Hs.493867	NM_052862.2	165865954	165942109	1q24.2	UP LOB
RPL31	Ribosomal protein L31	image:309643	N98434	Hs.469473	NM_000993.2	100985183	100989312	2q11.2	UP LOB
RPL34	Ribosomal protein L34	image:178137	H47015	Hs.438227	NM_000995.3	109761171	109771086	4q25	UP LOB
SEPP1	Selenoprotein P, plasma, 1	ipso:0000013		Hs.652198	NM_005410.2	42835740	42847781	5p12	UP LOB
SFRP1	Secreted frizzled-related protein 1	image:783700	AA446824	Hs.213424	NM_003012.3	41238636	41286137	8p11.21	UP LOB
SPARCL1	SPARC-like 1 (mst9, hev9)	image:289272	N73696	Hs.62886	NM_004684.2	88613514	88669530	4q22.1	UP LOB
TEK	TEK tyrosine kinase, endothelial (venous malformations, multiple cutaneous and mucosal)	image:151501	H02848	Hs.89640	NM_000459.2	27099286	27220171	9p21.2	UP LOB
TF	Transformin	image:246018	N52306	Hs.516267	NM_001063.2	134947925	134980325	3q22.1	UP LOB
TGFBR2	Transforming growth factor, beta receptor II (70/80kDa)	image:309647	N98436	Hs.82028	NM_001024947	30622896	30710635	3p24.1	UP LOB
TNFRSF1B	Tumor necrosis factor receptor superfamily, member 1B	image:307628	N92967	Hs.256278	NM_001066.2	12149847	12191863	1p36.22	UP LOB
TENXB	Tenascin XB	image:124340	R00971	Hs.485104	NM_019105.5	32116911	32185131	6p21.32	UP LOB
TUBB6	Tubulin, beta 6	image:264801	N21031	Hs.193491	NM_032525.1	12298257	12316567	18p11.21	UP LOB
TXNIP	Thioredoxin interacting protein	image:5893349	BQ001703	Hs.533977	NM_006472.1	144149939	144153880	1q21.1	UP LOB
VWF	Von Willebrand factor	image:154475	R54854	Hs.440848	NM_000552.3	5928301	6104097	12p13.31	UP LOB
UP DUC	more expressed in ductal than in lobular carcinomas								
UP LOB	more expressed in lobular than in ductal carcinomas								

Biological processes (Gene Ontology) associated with genes differentially expressed between ILCs and IDCs.

Extracellular region and matrix p= 1.13E-07	ADIPOQ	↑	OMD	↑
	DPT	↑	SEPP1	↑
	ELN	↑	SPARCL1	↑
	IGF1	↑	TF	↑
	MFAP4	↑	TNXB	↑
	MMP3	↑	VWF	↑
Protein kinase p= 0.02	ERG	↑	PIK3CD	↑
	JAK2	↓	TEK	↑
	PDK4	↑	TGFBR2	↑
	ERBB2	↓		
Apoptosis p= 0.01	CIDEA	↑	NGFR	↑
	F2R	↑	TNFRSF1B	↑
Cell motility p= 4.73E-04	IGF1	↑	JAK2	↑
	F2R	↑	PECAM1	↑
Cell adhesion p= 0.002	CD34	↑	OMD	↑
	CDH1	↓	PECAM1	↑
	DPT	↑	SCARB1	↓
	MFAP4	↑	TNXB	↑
	MYBPC2	↓	VWF	↑
Protein folding p= 0.015	FKBP4	↓	STUB1	↓
	HSPA8	↓		

↑ overexpression in ILCs;

↓ underexpression in ILCs.

Table 5

SVM classification of a validation set of 199 breast tumors

SVM classification				
Histological typing	N	IDC	ILC	Accuracy (%)
IDC	171	151	20	88.3
ILC	28	7	21	75.0
Total	199	158	41	